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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,107	04/10/2006	Shigeru Suzuki	289354US2X PCT	9414

22850 7590 02/12/2008

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EXAMINER	
MASKELL, MICHAEL P	

ART UNIT	PAPER NUMBER
2881	

NOTIFICATION DATE	DELIVERY MODE
02/12/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/575,107	SUZUKI, SHIGERU	
	Examiner	Art Unit	
	MICHAEL MASKELL	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/06/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because it exceeds 150 words. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1 (and its dependents 2-7) and 12 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation of "a chemical substance having low ionization probability" renders the claim indefinite because it is unclear what ionization probability values would be considered "low." Some examples of substances that the applicant considers to fall into this category are given in the specification, such as polycyclic aromatic hydrocarbons, oxine copper, halogenated hydrocarbons, and aromatic nitro compounds (p. 15), but these are given as examples, indicating that the list is not exhaustive. A definition of "low ionization probability" in the form of a numeric value for such a probability or other common property that all substances falling under the term would share is needed in order to distinctly claim the subject matter which the applicant regards as the invention. Claims 2-7 depend upon claim 1, and therefore import the same indefinite limitation, and are rejected for the same reason.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1, 3-14 and 20 rejected under 35 U.S.C. 102(a) as being anticipated by Suzuki, S., Yasuhara, A. and Sakai, S. ("A New Ionization Method for the LC/MS of Wastes and Related Compounds," Japan Society for Environmental Chemistry, Pages 764-765, 2003; hereafter referred to as "Suzuki," present in IFW, page numbers in rejection refer to pages of the English translation in IFW).

Regarding claim 1, Suzuki discloses an in-spray glow discharge ionization method comprising the steps of: (a) supplying a gas exhibiting Penning effect (Argon is supplied, see p. 2, and is a gas that exhibits Penning effect) so as to surround a fluid containing a compound to be measured for forming a nebulized flow of the fluid (p. 2 second paragraph); and (b) generating glow discharge in the nebulized flow to generate cations of the gas exhibiting Penning effect and excited atoms exhibiting Penning effect so as to ionize a chemical substance having low ionization probability with high sensitivity, directly or indirectly through an intermediately generated chemical species (p. 2 second paragraph).

Regarding claim 3, Suzuki discloses wherein a rare gas is used as the gas exhibiting Penning effect (Ar is a rare gas).

Regarding claim 4, Suzuki discloses wherein argon is used as the rare gas (p.

2).

Regarding claim 5, Suzuki discloses wherein the rare gas is argon and argon cations and excited Argon are generated (p. 2).

Regarding claim 6, Suzuki discloses further comprising blowing a dry gas in order to dry the nebulized flow (Fig. 1).

Regarding claim 7, Suzuki discloses wherein nitrogen gas is used as the dry gas (Fig. 1).

Regarding claim 8, Suzuki discloses an in-spray glow discharge ionization apparatus comprising: (a) a supply port supplying a fluid containing a compound to be measured (Fig. 1 and p.2); (b) a gas blowing port which surrounds the supply port and which blows a gas exhibiting Penning effect to nebulize the fluid supplied from the supply port (Fig. 1); (c) a ground-side discharge electrode provided at a generation port at which the nebulized flow is generated (Fig. 1); and (d) a voltage application-side discharge electrode which is disposed in the traveling direction of the nebulized flow and opposed to the ground side discharge electrode (Fig. 1); wherein measurement is performed using a mass spectrometer by ionizing components of the compound to be measured which constitutes the fluid using a cationized and excited gas exhibiting Penning effect while the fluid is being nebulized by the gas exhibiting Penning effect (p. 2).

Regarding claim 9, Suzuki discloses further comprising a dry gas blowing port for drying the nebulized flow provided around or in the vicinity of the supply port and the gas blowing port for blowing a gas exhibiting Penning effect for nebulizing the fluid (p.

2).

Regarding claims 10 and 11, Suzuki discloses wherein the gas exhibiting Penning effect is a rare gas, wherein the rare gas is Ar (p. 2).

Regarding claim 12, Suzuki discloses wherein the compound to be measured is a chemical substance which has a low ionization probability (p. 2; although "low ionization probability" is an indefinite term as noted above, the examiner believes that whatever scope is intended by said term is equivalent to the term "poor ionization sensitivity" in the reference).

Regarding claim 13, Suzuki discloses wherein the chemical substance is an aromatic nitro compound (p. 2).

Regarding claim 14, Suzuki discloses wherein the dry gas is nitrogen (Fig. 1).

Regarding claim 20, Suzuki discloses wherein electrical insulation is performed in an ion source except for the front end of the electrodes (Fig. 1).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 2 rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Kobayashi (JP 2002-015698; in IFW). Suzuki discloses the apparatus according to claim 1, but fails to teach wherein the nebulized flow is heated; however, Kobayashi teaches that it is advantageous to heat a nebulized flow that is blown with a

dry gas, as taught in the invention and in the Suzuki reference. According to Kobayashi, heating the flow increases the efficiency of drawing sample ions into a mass spectrometer, as is a common application of ion sources such as that taught by Suzuki. It would therefore have been obvious to one of ordinary skill in the art at the time the invention was made to heat the nebulized flow. The motivation for doing so is taught by Kobayashi ("Effect of the Invention").

8. Claims 15 and 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Sakairi, et al (JP 2001-093461; in IFW). Suzuki discloses the apparatus according to claim 8, but fails to teach wherein a surface of at least one of the discharge electrodes is covered with a substance which has a low oxidation state, or which is gold, platinum, or silver; however, Sakairi teaches an ion source for mass spectrometry wherein the electrodes are plated with gold (paragraph 0030). Sakairi teaches that the reasoning for doing so is to protect the electrodes from corrosive gas. Since the materials that Suzuki intends his apparatus to be used with are corrosive (waste materials such as polycyclic aromatic hydrocarbons, oxine lopper, halogenated hydrocarbons, and aromatic nitro compounds), it would have been obvious to one of ordinary skill in the art to cover at least one of the discharge electrodes with gold to protect it as taught by Sakairi.

9. Claims 17, 18 and 19 rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Mimura, et al (JP 02-135655; in IFW). Suzuki discloses the apparatus according to claim 8, but fails to teach wherein the voltage application-side discharge electrode includes a plurality of electrodes, wherein each of said plurality of

electrodes is a needle-shaped electrode, or wherein a tertiary actuator is provided for adjusting three-dimensional positions of the electrodes; however, Mimura teaches a plurality of needle electrodes (5) used in an atmospheric pressure ionization source that is analogous to Suzuki's art. Mimura teaches that the radial arrangement of needle electrodes causes produced ions to be focused into the mass spectrometer for higher extraction efficiency (Abstract). It would therefore have been obvious to one of ordinary skill in the art to supply a plurality of needle-shaped electrodes and an actuator for adjusting their three dimensional positions to create a radial arrangement in the apparatus taught by Suzuki; such a provision would be motivated by the knowledge that such an arrangement causes greater extraction efficiency into the mass spectrometer (or other measurement device).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tsuchiya, et al (U.S. Patent 4,546,253), Laremee, et al (U.S. Patent 7,112,785 B2), Bertrand, et al (U.S. Patent 6,124,675), and Zhu (U.S. Patent 5,192,865) all teach methods of atmospheric pressure ionization using metastable atoms, and energy transfer from metastable atoms is the definition of the Penning effect. These references do not perform glow discharge in the same space where the metastable atoms and the sample particles mix; rather the glow discharge is performed only on the Penning gas to form metastable atoms which are then sent to another location to ionize the sample particles; however, the applicant should be aware of the contents of these teachings when drafting any amendment.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL MASKELL whose telephone number is (571)270-3210. The examiner can normally be reached on Monday-Friday 8AM-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 571/272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael Maskell/
Examiner, Art Unit 2881
31 January 2008

/ROBERT KIM/

Supervisory Patent Examiner, Art Unit 2881